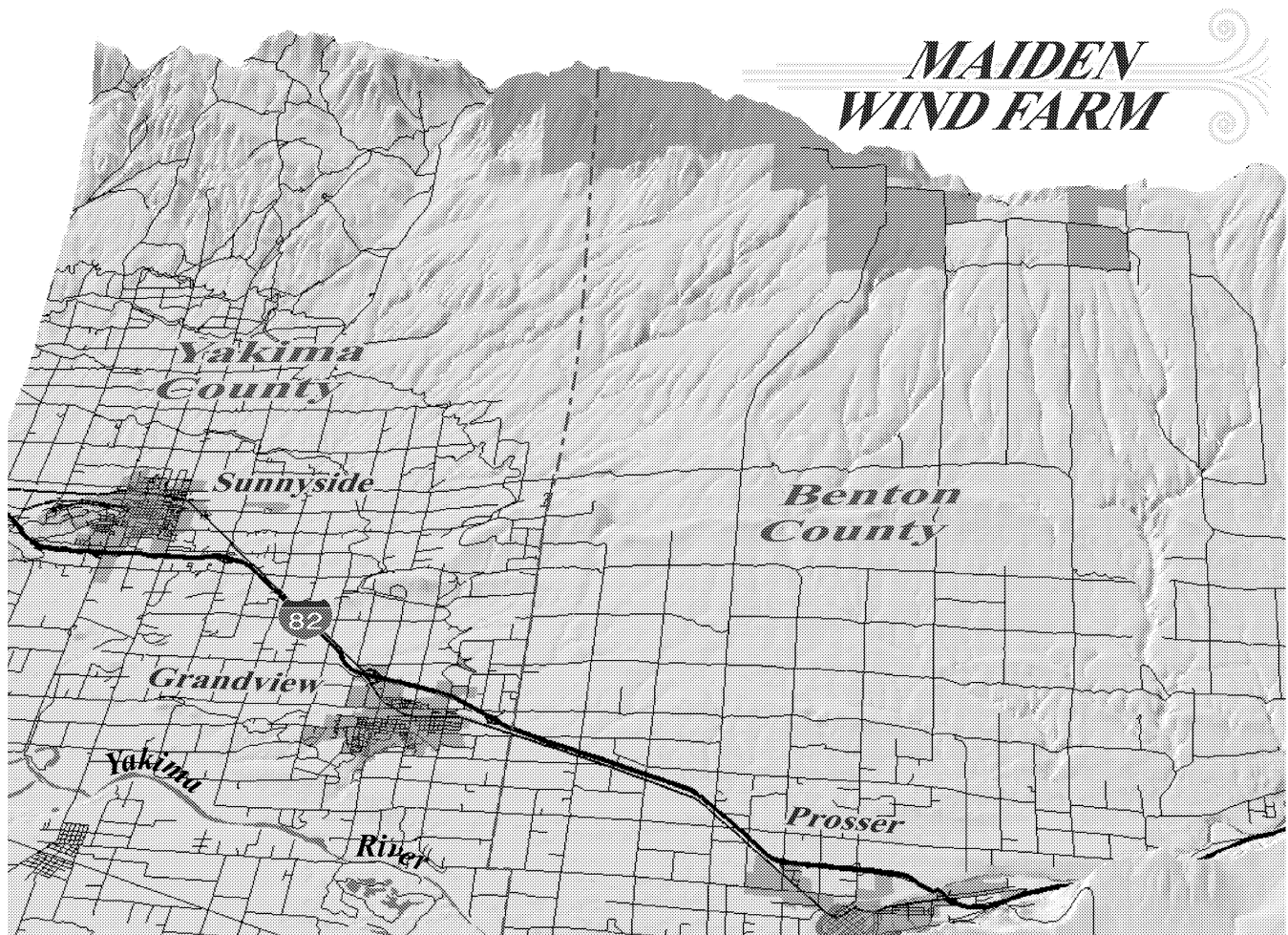


MARCH 2002

# MAIDEN WIND FARM

Draft NEPA/SEPA Environmental Impact Statement - Summary  
DOE/EIS-0333

Bonneville Power Administration  
Benton County, Washington



# Summary

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## Introduction

Bonneville Power Administration (BPA) is a federal power marketing agency under the U.S. Department of Energy (DOE) that is responsible for marketing electrical power to utility, industrial, and other customers in the Pacific Northwest, pursuant to the Bonneville Project Act of 1937, the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Public Law [PL] 96-501, Northwest Power Act), and other statutes. In addition to marketing power from the federal hydro system in the Pacific Northwest, BPA purchases and markets power from other generation sources in the region to adequately serve its customers, as required by statute. BPA also owns and operates over 15,000 miles of high-voltage transmission lines that move power from generation resources to electric utilities and direct service industries. BPA encourages the development of renewable energy resources in the Pacific Northwest to meet customer demand for power, diversify its resource portfolio, and meet its obligations under the Northwest Power Act.

Deregulation of the electric industry and subsequent energy supply issues have emphasized the need for new and diverse energy sources in BPA's service area, the Pacific Northwest. Renewable resources like wind would not only help diversify BPA's energy resource portfolio, but are preferred by many consumers concerned about environmental effects of other power sources. BPA has marketed output from renewable power projects as "green power" to satisfy demand from these consumers and to increase the amount of renewable energy resources in the region's power supply. The Northwest Power Planning Council's (NWPPC) Fourth Conservation and Electric Power Plan recommended that Northwest utilities offer green power purchase opportunities as a way to help the region integrate renewable resources into the power system in the future.

In February 2001, Washington Winds Inc. (the project developer) submitted a proposal to BPA for a site north of the cities of Sunnyside and Prosser in Washington where wind power facilities could be developed. After considering preliminary information, BPA decided to examine the proposed project and consider purchasing and transmitting power from the project. The project developer also submitted Conditional Use Permit (CUP) applications to Benton and Yakima Counties. Benton County, serving as the lead agency for the State Environmental Policy Act (SEPA), issued a Determination of Significance on June 11, 2001.

The National Environmental Policy Act (NEPA) (42 *U.S. Code* [USC] Section 4231 et seq.) requires federal agencies to prepare and make public an EIS for major federal actions or decisions that could significantly affect the quality of the human environment, including the natural and physical environment. Benton County, as the lead agency for SEPA, may adopt environmental analysis prepared under NEPA.

The Washington State Environmental Policy Act requires that an environmental impact statement be prepared on proposals for legislation and other major actions having a probable significant, adverse environmental impact.

This EIS provides environmental information to the public and to federal, state, and local agencies, officials, and decision-makers regarding the effects of the proposed action. The Final EIS will respond to public and agency comments on this Draft EIS. It may also provide necessary clarifications, elaboration, and revisions to this draft.

BPA will consider the information in this EIS, public comments, and other factors when deciding whether to purchase power from the proposed wind project and transmit it over BPA transmission lines. Benton and Yakima County Planning Departments will consider information in this EIS when deciding whether to grant CUPs and allow the proposed project to be developed.

BPA's proposed action is the execution of power purchase and construction and generation interconnection agreements to acquire and transmit up to 50 aMW<sup>1</sup> (up to about 200 MW) of output from the proposed Maiden Wind Farm, which would be developed to generate up to 494 MW. Benton and Yakima Counties' proposed action is to grant Conditional Use Permits (CUPs) and other required permits for full build-out of the project, which would require construction of up to 549 wind turbines for a 494-MW project.

This EIS evaluates two alternatives—the Proposed Action (which means that part or all of the proposed project would be built) and No Action. BPA would not purchase or transmit power from the project under the No Action Alternative and it is therefore likely that the project would not be constructed.

## Purpose of and Need for the Proposed Action

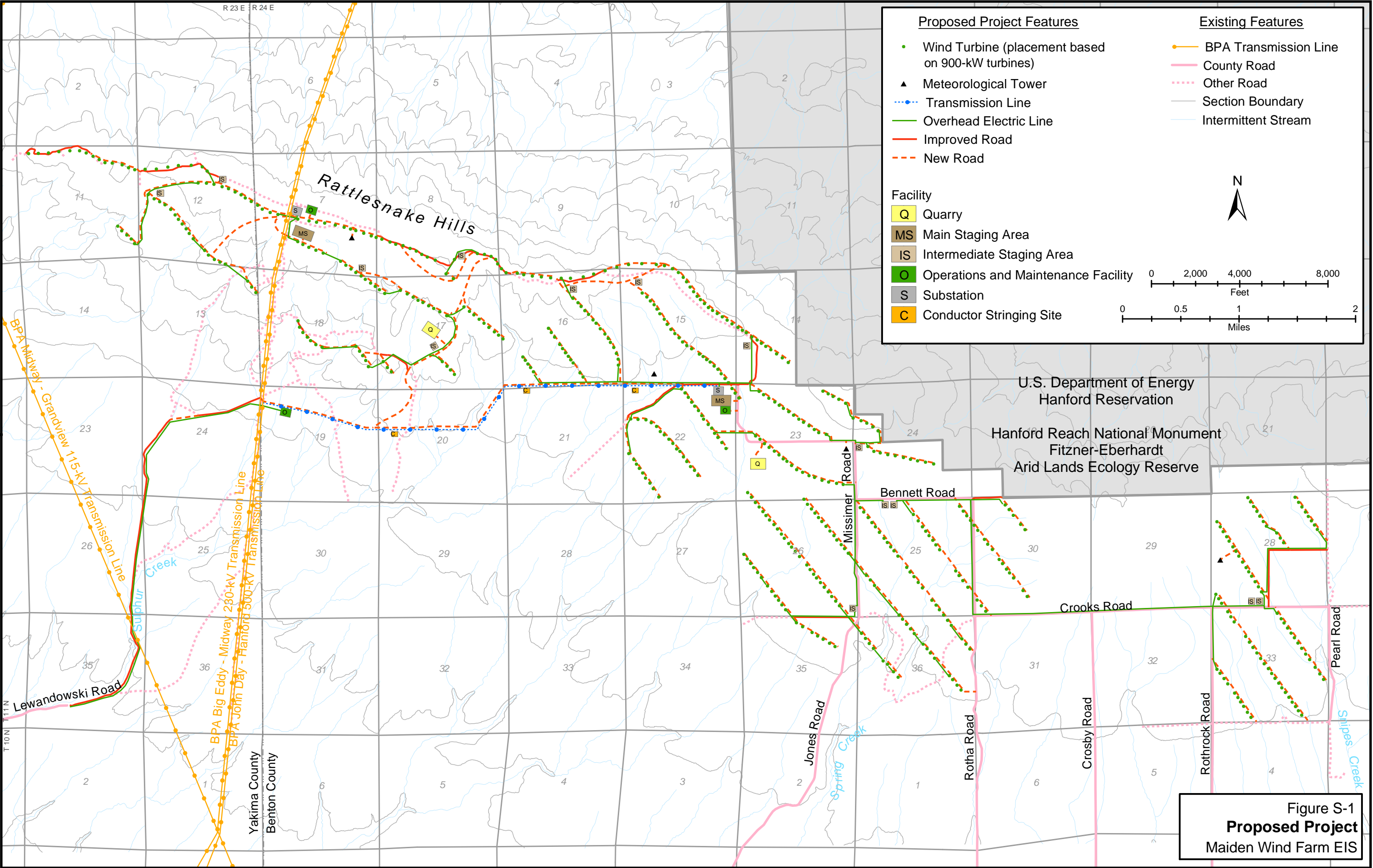
The need for the proposed action arises primarily from BPA's statutory obligations and planning directives. BPA may need to acquire additional power generation resources in order to meet the projected electric power requirements (i.e., loads) of its customers, as required by the Northwest Power Act. BPA also may need to acquire power from renewable resources in order to comply with the Northwest Power Act, the President's National Energy Policy, and BPA's own planning documents. Finally, BPA may need to specifically acquire power from wind resources to help meet its statutory obligations under the Northwest Power Act and conform with goals in the President's National Energy Policy.

The purposes (i.e., objectives) of the proposed action are to:

- Acquire wind power to fulfill BPA's obligations under the Northwest Power Act regarding the acquisition of additional power generation resources and development of renewable energy resources
- Further the objectives of the President's National Energy Policy to diversify energy sources by making greater use of nonhydroelectric renewable sources such as wind power
- Protect BPA and its customers against risk of power outages by diversifying BPA's energy supplies

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<sup>1</sup> Average MW or "aMW" indicates the average amount of energy supplied over a specified period of time, in contrast to "MW," which indicates the maximum or peak output that can be supplied for a short period. Wind projects only generate power when the wind is sufficient to operate the turbines. In general, wind projects operate about one-quarter to one-third of the time (it varies in different locations), so a wind project with a capacity of 150 to 200 MW would generate *about* 50 aMW.



- Meet growing customer demand for energy from renewable energy resources
- Ensure consistency with the resource acquisition strategy of BPA's Resource Programs and Business Plan
- Further the objective of BPA's PBL Strategic Plan to increase the amount of renewable energy resources under contract and to evaluate issues of integration and operation of wind resources
- Respond to the project developer's application to BPA for the purchase and transmission of power generated by wind turbines at the proposed Maiden Wind Farm site.

## Description of Proposed Project

Washington Winds Inc. proposes to construct and operate up to 494 megawatts (MW) of wind generation on privately- and publicly-owned property in Benton and Yakima Counties, Washington. This EIS evaluates the environmental effects of BPA's Proposed Action to execute power purchase and interconnection agreements for the purpose of acquiring up to 50 average megawatts (aMW) (up to about 200 MW) of the project developer's proposed Maiden Wind Farm. The project developer has requested a CUP for up to 494 MW. Although the full 494 MW of power may or may not be constructed, this EIS evaluates impacts from full build-out of the project.

The project would be located about 10 miles northeast of Sunnyside in the Rattlesnake Hills and would occupy approximately 251 acres of land. Approximately 1,063 acres would be temporarily occupied during construction by facilities such as staging areas, equipment laydown areas, and rock quarries. Except for portions of two sections of land owned by the Washington Department of Natural Resources (DNR), the project would be constructed on privately-owned farm and ranch land in Benton and Yakima Counties.

The major facilities of the project include up to 549 wind turbines with small transformers at the base of each turbine tower, underground and overhead collector cables, access roads, up to two substations, up to three operation and maintenance buildings, a potential 4-mile 230-kilovolt (kV) transmission line, and up to four meteorological towers (see Figure 2.1-2). Construction of the project could begin in summer 2002, with at least partial power generation expected as early as winter 2002-2003. Construction of the full project would take about nine months.

## Wind Turbines

Up to 549 wind turbines would be arranged in numerous "strings" for a maximum of about 30 total miles of turbine strings. The height of the turbines would range from about 300 feet to 390 feet, depending on the turbine size selected. The project developer would select a single wind turbine design from a range of turbines that produce 900-kilowatt (kW) to 2,000-kW output each. If 2,000-kW turbines (390 feet high) were used, 247 turbines would be constructed. If 900-kW turbines (about 325 feet high) were used, 549 turbines would be constructed. This EIS evaluates this latter scenario because it represents the maximum number of turbines, and the maximum environmental impact potential of the project.

The turbine type likely to be used is an upwind, dual-speed turbine (i.e., the nacelle would move so that the rotor always faces upwind and turns at one of two speeds, depending on the current wind speed). The typical range of wind speeds for these turbines to operate is 9 to 56 miles per hour (mph). At higher speeds the turbines automatically stop to avoid damage, and remain stationary until the wind slows.

Wind turbines consist of the foundation, tower, nacelle, and rotor (hub and three rotor blades). The nacelle is mounted at the top of the tower and houses the gearbox and generator. The rotor attaches to the nacelle. The newer-generation wind turbines have rotors that make one revolution approximately every 3-4 seconds, which increases the blade visibility to birds compared to the old, faster-moving turbine models. Newer turbine models also use tubular towers instead of lattice towers to eliminate perching opportunities for birds.

The towers would be painted neutral gray or off-white to be visually less obtrusive. Some of the towers would be furnished with obstruction lighting at the top of the nacelle for aircraft safety. The number of wind turbines with lights and the type of lighting would be determined in consultation with the Federal Aviation Administration (FAA).

Wind turbine foundations most likely would be caisson-type but potentially could be a spread footing-type. The type of foundation would be determined based on site geotechnical study information after construction bids are received and evaluated.

## **Electrical System**

The project developer would build and maintain one (for a 50 aMW project) or two (for a larger project) fenced substation sites occupying up to 4 acres each. The sites would be gravel except for concrete pads underneath transformer and switching equipment. Transformers would be nonpolychlorinated biphenyl (PCB) oil-filled types.

Electric lines would be installed to connect the turbines and turbine strings. The initial stage of the project would be connected through the project's western substation to BPA's existing Big Eddy-Midway 230-kV transmission line that crosses the northwest portion of the study area. The most likely interconnection option for subsequent stages would be to build a new 4-mile 230-kV transmission line from a second substation in the eastern portion of the project site to interconnect with BPA's Big Eddy-Midway 230-kV transmission line.

## **Meteorological Towers**

Meteorological (met) towers are used to measure wind conditions. They are slender steel towers approximately 165 feet high. These towers usually have 3 or 4 anemometers to record wind speeds at several elevations. There is one met tower currently on the project site and two or three additional met towers would be installed for the project. The met towers would be constructed upwind of turbine strings or groups of turbine strings to monitor wind strengths as part of the process used to confirm turbine performance.

## **Access Roads**

The western end of the study area in Yakima County is accessible via Interstate 82, State Route 241, and Lewandowski Road, then via private ranch roads. The eastern portion of the study area in Benton County is accessible via Interstate 82, North Gap Road, and other rural



roads. The project would include improving existing private roads and constructing new gravel roads on private property to provide access for construction vehicles and equipment. Up to 10.3 miles of existing private roads would need to be improved and up to 44.5 miles of new roads would be constructed.

## **Operation and Maintenance Buildings**

Up to three permanent O&M facilities would be constructed on the project site. Each O&M building would be approximately 20,000 square feet, including an office and workshop area, restroom, and kitchen facility. The O&M buildings, including parking, would be on 4-acre sites.

## **Temporary Staging Areas**

During wind turbine installation, several temporary laydown or staging areas would be required. Depending on the size of the project, these areas would include up to two 10-acre main staging areas and up to 14 2-acre intermediate staging areas where tower sections, nacelles, and other components would be temporarily stored as each wind turbine string is constructed. In general, a 2-acre laydown/staging area would be required for each group of 25 to 50 turbines. After construction has been completed, laydown and staging areas would be graded and reseeded to wheat or native grasses as necessary to restore the area as close as possible to its original condition.

## **Quarry Sites/Concrete Batch Plants**

Two quarry sites with concrete batch plants would be needed. The eastern quarry pit already exists and the western quarry would need to be developed. The quarries could possibly provide all the gravel supplies for construction of the project. Approximately 8 acres would be needed for each quarry and ancillary facility. The sites would include the quarry, raw material stockpiles (for example, sand and gravel, concrete aggregates), a mobile crusher for the concrete batch plant, a diesel generator, parking, storage, and a settling pond.

## **Employment**

The project developer anticipates that about 150 workers would be employed for approximately 9 months to construct the facilities. A peak workforce of up to 350 workers would be onsite during an estimated 4-month peak construction period. Construction workers would be employees of various construction and equipment manufacturing companies under contract to the project developer.

Up to 15 permanent full-time staff would be employed during operation of the project. Most of the O&M staff would likely be hired locally. One or two supervisors with experience at other wind turbine projects would supervise the O&M staff.

## **Decommissioning**

For financial evaluation and contractual purposes, the project is assumed to have a useful life of 20 years. The trend in the wind energy industry has been to “repower” older wind energy projects by upgrading equipment with more efficient turbines. It is likely that the project would be upgraded with more efficient equipment and could have a useful life far

longer than 20 years. BPA would have the option to extend its power purchase agreement at that time. If the project were terminated, the project developer would request the necessary authorizations from the appropriate regulatory agencies and landowners to decommission the facilities. All facilities would be removed to a depth of 3 feet below grade and unsalvageable material would be disposed of at authorized sites. The soil surface would be restored as close as possible to its original condition, or to match the current land use. Reclamation procedures would be based on site-specific requirements and techniques commonly employed at the time the area would be reclaimed.

## **No Action Alternative**

Under the No Action Alternative, BPA would not purchase or transmit power from the proposed project. Therefore, it is likely that the project would not be constructed or operated, and the potential environmental impacts associated with the proposed project would not occur. However, it also is likely that the region's need for power would be addressed through the development of other generation to provide up to 494 MW (about 150 aMW) of capacity that would have been provided by the proposed project.

## **Preferred Alternative**

BPA's preferred alternative is the proposed action to execute power purchase and construction and interconnection agreements to acquire and transmit up to 50 aMW of output from the project developer's proposed Maiden Wind Farm. The proposed project is the only alternative that meets the underlying need for the action and best meets the purposes of the action.

## **Potential Impacts and Mitigation Measures**

Table S-1 provides a summary of the potential environmental impacts of constructing, operating, and decommissioning the proposed Maiden Wind Farm. Mitigation measures are included and, in most cases, implementation of these measures, or other standard design and construction practices, would reduce the potential impacts of the project to a low level. Significant and unavoidable adverse impacts have been identified for 1) visual resources due to the change in the visual environment resulting from wind turbines being placed along the ridgetops of the Rattlesnake Hills; 2) ferruginous hawk, a federal species of concern and state threatened species, if this species were to be harmed by operation of the wind turbines; and 3) land use conflicts with sensitive research facilities on the Hanford Reservation, if operation of the project caused enough seismic vibration and acoustic noise to disrupt the facilities.



TABLE S-1

Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                          | Residual Impacts After Mitigation |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>1. Land Use and Recreation</b>                                                                                                                                                                                                                                                                                                                                               |                                  |                                                                                                                                                                                                                                                                                                                     |                                   |
| <b>Construction</b>                                                                                                                                                                                                                                                                                                                                                             |                                  |                                                                                                                                                                                                                                                                                                                     |                                   |
| During construction, about 1,063 acres of land would be altered temporarily, interfering with existing agricultural uses.                                                                                                                                                                                                                                                       | Moderate                         | A. Coordinate construction activities with landowners to minimize interference with agricultural uses. Regrade and reseed all areas impacted by temporary project facilities such as quarries, laydown areas, and staging areas to restore them as close as possible to their original condition and land uses. (✓) | Low to Moderate                   |
| Existing land use on the proposed 8-acre quarry site would be altered until the land recovered.                                                                                                                                                                                                                                                                                 | Low                              | B. The Benton County Mineral Resources ordinance requires that the quarry site be compatible with existing land uses and that the site be restored as close as possible to its original condition when the quarry is closed. (✓)                                                                                    | Low                               |
| The science program operations of the Laser Interferometer Gravitational-Wave Observatory (LIGO) and the Battelle Gravitational Research Observatory (BGRO) on the Hanford Site could potentially be adversely impacted by project construction activities (e.g., blasting for foundations and quarry operations), estimated to last about one-half of the construction period. | Moderate to High                 | C. Notify the facilities in advance of construction activities with the potential to cause significant vibration or noise. (*)                                                                                                                                                                                      | Low                               |
| No designated public recreational facilities exist in the study area. Limited temporary impacts to private landowner-approved activities such as hunting or photography could occur during project construction.                                                                                                                                                                | Low                              | None necessary.                                                                                                                                                                                                                                                                                                     | Low                               |
| <b>Operation and Maintenance</b>                                                                                                                                                                                                                                                                                                                                                |                                  |                                                                                                                                                                                                                                                                                                                     |                                   |
| Project facilities (including roads) would result in permanent change in land use of about 251 acres of land from agriculture to energy production.                                                                                                                                                                                                                             | Low                              | None necessary.                                                                                                                                                                                                                                                                                                     | Low                               |
| Landowners, including Washington State Department of Natural Resources (DNR), would receive compensation for the use of their property through a lease agreement with the project developer.                                                                                                                                                                                    | Low                              | None necessary.                                                                                                                                                                                                                                                                                                     | Low                               |
| Less than 100 acres of Conservation Reserve Program (CRP) contracts would be terminated where permanent project facilities would be located.                                                                                                                                                                                                                                    | Low                              | D. Proposed mitigation measures for vegetation and wildlife impacts include enhancing, protecting, and creating additional natural habitat on existing private lands, particularly CRP land, near the project site. See 2.A. below. (*)                                                                             | Low                               |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                  | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Residual Impacts After Mitigation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| There is a slight possibility that placement of wind turbines or operation of the electronic equipment associated with the wind turbines could adversely affect several radio towers and communication facilities located along the ridgetop of the Rattlesnake Hills.                                                                                                            | Low to High                      | E. Site wind turbines out of the signal paths of existing radio and telecommunications towers. (*)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Low                               |
| The scientific programs at the LIGO and BGRO facilities on the Hanford Site could potentially be adversely impacted by seismic vibrations and acoustic noise from operation of the wind turbines. Such an impact is not expected due to the expected low levels of vibration that would be generated by the project and the distance between the project and these facilities.    | Low to High                      | F. A seismic study will be completed in consultation with the facilities prior to construction to determine whether operation of the proposed project would disrupt the research facilities. Results of the study will be discussed in the Final EIS. (*)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Low to High                       |
| Beneficial impacts could occur from increased access provided by roads constructed or improved for the project.                                                                                                                                                                                                                                                                   | Low                              | None necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Low                               |
| No designated public recreational facilities exist in the study area. Minor temporary modifications of activities allowed at landowner discretion, such as hunting or photography, could occur during project operation.                                                                                                                                                          | Low                              | None necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Low                               |
| <b>Decommissioning</b><br><br>No land use or recreation impacts would result from decommissioning the project. Acreage containing project facilities could be returned to pre-project agricultural uses.                                                                                                                                                                          | None                             | None necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | None                              |
| <b>2. Vegetation</b>                                                                                                                                                                                                                                                                                                                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |
| <b>Construction</b><br><br>Approximately 57.5 acres of priority shrub-steppe habitat would be permanently displaced by project facilities and 174.4 acres would be temporarily impacted by project construction activities.<br><br>Approximately 12.2 acres of priority lithosol habitat would be permanently impacted and 50.9 acres temporarily impacted by project facilities. | Low to Moderate<br><br>High      | A. Total acres of steppe habitat types impacted would be replaced or enhanced in similar proportions at a ratio of 3:1 by either enhancing local CRP lands to facilitate their recovery to high-quality steppe habitat, or by creating steppe habitat from nearby agriculture lands by reclaiming them with native grass and shrub species. In selecting mitigation areas, priority may be given to areas with remnant lithosol habitat, as lithosol is extremely difficult to replicate, as well as areas that would best enhance reproductive rates of wildlife species likely to be impacted by the project. Any enhanced or replacement acres would be protected for the life of the project from development, grazing, or conversion to other habitat types. (*) | Low<br><br>Moderate               |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                  | Impact Level Prior to Mitigation | <b>Proposed Mitigation Measures</b><br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Residual Impacts After Mitigation |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Improvements to the existing access road along Sulphur Creek would impact less than 5 percent of the priority riparian habitat in the study area. | Low                              | <p>B. Prior to the start of construction, convene a Site Management Plan Team (SMPT) to prepare a Site Management Plan (SMP). The SMPT would include representatives from the U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish and Wildlife (WDFW), Washington Department of Natural Resources (DNR), BPA, county representatives, landowners, and the project developer. The role of the SMPT would be to 1) protect the natural and agricultural resources identified in this EIS during construction by minimizing the areal extent and pattern of construction activities to that necessary for the efficient conduct of construction operations; 2) protect sensitive and unique species and habitats; and 3) assure the effective implementation of the standard design and construction measures proposed as part of the project, as well as mitigation measures included both during and post-construction. (*)</p> <p>The SMP would include provisions for:</p> <ol style="list-style-type: none"> <li>1) the siting of towers to minimize impacts on lithosol and rare plant communities;</li> <li>2) the design and implementation of a fire management and erosion control program/procedures;</li> <li>3) the location and physical marking of the boundaries of project storage and staging areas and soil deposition sites;</li> <li>4) procedures to keep the site clean daily of unconstrained project waste and toxics (petroleum products, paper, cans, materials remnants etc.) designate areas, and provide facilities and procedures for safe storage of toxic and hazardous substances;</li> <li>5) minimizing the extent of construction related roads and access routes;</li> <li>6) methods of delineation and marking (i.e. fencing, taping flagging) off-limit areas such as sensitive plant communities;</li> <li>7) size, location, and type of off-site habitat enhancement / replacement for the estimated 57.5 acres of shrub steppe and 12.2 acres of lithosol permanently impacted by the project;</li> <li>8) selecting recipient sites, restoration plans, and protocols for the estimated 174.4 acres of shrub-steppe and 50.9 acres of lithosol habitat that would be temporarily impacted by project construction activities;</li> </ol> | Low                               |

**TABLE S-1**

Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact | Impact Level Prior to Mitigation | <b>Proposed Mitigation Measures</b><br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Residual Impacts After Mitigation |
|------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|                  |                                  | <p>9) route project access roads to avoid, where possible, adverse impacts to sensitive vegetation, including wetlands;</p> <p>10) education of the construction work force relative to respecting and adhering to the physical boundaries, off-limit areas, fire and weed prevention measures etc., of the SMP;</p> <p>11) a weed control plan with protocols and procedures, vehicle cleaning and parking locations, etc., for minimizing the introduction of weed species to the construction site;</p> <p>12) a complete site plan for the SMP would be laid out (fenced, flagged, taped with use areas designated) on the ground prior to the start of construction of any phase of the project. (*)</p> <p>C. At the start of construction, the SMPT would be superseded by an SMP monitor who would be at the project site daily during construction activities. The monitor would be approved by the SMPT and contracted by Benton County with funds provided by the project developer. The monitor's principal role would be to ensure adherence to the provisions of the SMP and keep a daily record of activities, decisions, etc. relating to that objective. SMP issues that arise during construction that cannot be resolved on site (e.g., interpretation, unforeseen problems, adjustments of boundaries) would be resolved between the county and the project developer with technical expertise from the appropriate SMPT representative when needed. (*)</p> <p>D. During project construction, Best Management Practices (BMPs) would be employed to reduce impacts to adjacent vegetation and habitats and to minimize the construction footprint to the extent possible. (✓)</p> <p>E. Final facility design would be reviewed prior to construction, and any proposed disturbance areas that lie outside of the vegetation survey corridors would be surveyed for rare plants during the appropriate season. (✓)</p> |                                   |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Residual Impacts After Mitigation |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <p>The introduction of new noxious weed species could occur from construction equipment, vehicles, and worker's boots transporting seeds onto the project site. Once established in an area, negative impacts can include the following:</p> <ul style="list-style-type: none"> <li>• Loss of wildlife habitat</li> <li>• Alteration of wetland and riparian functions</li> <li>• Reduction in livestock forage and crop production</li> <li>• Displacement of native plant species</li> <li>• Reduction in plant diversity</li> <li>• Changes plant community functions</li> <li>• Increased soil erosion and sedimentation</li> <li>• Control and eradication costs to local communities</li> <li>• Reduction in land value.</li> </ul> | Low to High                      | <p>F. Prior to construction, a noxious weed control plan would be developed in consultation with local county weed control boards. The plan would be implemented over the life of the project. The plan would include specific measures such as the following:</p> <ul style="list-style-type: none"> <li>• Clean construction vehicles prior to bringing them to the project site.</li> <li>• Revegetate habitats temporarily disturbed as quickly as practicable with native species to minimize habitat (disturbed areas) for noxious weed invasion.</li> <li>• Actively control noxious weeds that have established themselves. Coordinate with the local county weed control boards regarding what control measures are most effective and coordinate with the appropriate agencies on how to avoid impacts to special status plants as a result of weed control measures. (*)</li> </ul> | Low to High                       |
| Ground disturbance would cause direct adverse impacts to about 8 percent of the total individuals contained in three Columbia milkvetch populations, a federal species of concern and Washington threatened species. Indirect impacts from changes in noxious weed densities and fire frequency patterns could also occur.                                                                                                                                                                                                                                                                                                                                                                                                                | Low                              | G. As required by the SMPT, prior to construction, the population boundaries of special status plants would be flagged or fenced to facilitate avoidance, and construction personnel would be instructed to completely avoid these marked areas wherever possible. During construction, the SMP monitor would inspect the populations to confirm that flagging and/or fencing is intact, and that construction activities avoid these sites to the extent possible. (*)                                                                                                                                                                                                                                                                                                                                                                                                                        | Low                               |
| Ground disturbance would cause direct adverse impacts to about 28 percent of the Snake River cryptantha, a Washington sensitive species, in the study area. If noxious weed densities were increased, an indirect adverse impact to this species could occur.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Low                              | None specifically, but implementation of measures described above would reduce impacts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Low                               |
| Ground disturbance would cause direct adverse impacts to about 11 percent of the predicted population of Rickard's Idaho milkvetch, a Washington Review Group 1 species.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Low                              | None specifically, but implementation of measures described above would reduce impacts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Low                               |
| Ground disturbance related to construction would likely directly impact two state watch list species—rosy balsamroot and curvoped milkvetch.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Low                              | None specifically, but implementation of measures described above would reduce impacts.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Low                               |
| <p><b>Operation and Maintenance</b></p> <p>Vehicles and workers could introduce and/or spread noxious weeds in the study area.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Low to High                      | Implement the noxious weed control plan described in 2.F., above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Low to High                       |

TABLE S-1

Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Impact Level Prior to Mitigation             | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Residual Impacts After Mitigation                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Decommissioning</b><br><br>Decommissioning impacts would be similar to construction impacts but lower, assuming that all access roads remain in place. Vehicles would travel on established roadways, which would not impact vegetation, except for the possible introduction and/or spread of noxious weeds. Vegetation around facilities to be removed would likely be impacted to the same extent as described for construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Low                                          | H. Remove facilities to a depth of 3 feet below grade and restore the soil surface as close as possible to its original condition, or to match the current land use. Reclamation procedures would be based on site-specific requirements and techniques commonly employed at the time the area would be reclaimed, and would likely include regrading, adding topsoil, and revegetating all disturbed areas. Roads would be reclaimed or left in place based on landowner preference. (✓)                                                                                                                                                                                                                                                                                                                                                                                                            |                                                  |
| <b>3. Wildlife</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                  |
| <b>Construction</b><br><br>Approximately 414 acres of native habitat (nonagricultural land) would be temporarily removed or damaged during project construction. See Vegetation section, above, for specific mitigation.<br><br>Bald eagle, a federal- and state-threatened species, is a possible rare migrant in the study area but has not been documented and is not expected to occur in the study area on a regular basis.<br><br>Peregrine falcon, a federal species of concern and Washington endangered species, is a rare migrant through the study area. Only two individuals were observed in the study area during surveys.<br><br>Golden eagle, a Washington candidate species, is a rare migrant and possible winter resident in the study area. One golden eagle was observed in the study area during fall surveys. They have also been documented on the nearby ALE during the winter in low numbers. They are not expected to occur in the study area on a regular basis. | Low to High<br><br>Low<br><br>Low<br><br>Low | A. As discussed in 2.B. above, prior to the start of construction, convene a Site Management Plan Team (SMPT) to prepare a Site Management Plan (SMP). The SMP would include provisions for:<br><br>1) placement of towers the minimum distance from raptor nesting sites according to WDFW Management Plan criteria;<br>2) maintaining reasonable driving speeds so as not to harass or accidentally strike wildlife;<br>3) methods of delineation and marking (i.e. fencing, taping flagging) off-limit areas such as sensitive plant communities and raptor nest sites;<br>4) if any new nesting, denning, or otherwise sensitive wildlife sites are located during construction, these areas would be mapped, marked, and included in the off-limit areas;<br>5) seasonal timing of construction to avoid, as best practicable, the courting, nesting and breeding season of sensitive avifauna; | Low to Moderate<br><br>Low<br><br>Low<br><br>Low |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                          | Residual Impacts After Mitigation |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| One merlin, a Washington candidate species, was observed in the study area in April 2001, and was likely a migrant. Merlins are considered an uncommon migrant and winter resident on the ALE, and occupy riparian areas or migrate along Rattlesnake Ridge. There is no suitable nesting habitat in the study area and they are considered a rare migrant and/or unlikely winter resident.                                                                                                                                                                                | Low                              | 6) a complete site plan for the SMP would be laid out (fenced, flagged, taped with use areas designated) on the ground prior to the start of construction of any phase of the project. (*)<br><br>B. As discussed in 2.C. above, an SMP monitor would be at the project site daily during construction activities to ensure adherence to the provisions of the SMP and keep a daily record of activities, decisions, etc. relating to that objective. (*)<br><br>C. Results of the baseline avian surveys would be used to help with final project design, turbine siting, and mitigation planning via the SMP. (✓) | Low                               |
| Loggerhead shrike (federal species of concern; Washington candidate species), and sage thrasher and sage sparrow (Washington candidate species) were observed during surveys and are likely breeding residents in the study area.                                                                                                                                                                                                                                                                                                                                          | Low                              | D. Big sagebrush stands near construction areas that are suitable for nesting by loggerhead shrikes, sage thrashers, and sage sparrows would be flagged and designated as no disturbance zones. These areas would be flagged as off-limits to disturbance by construction personnel. (*)                                                                                                                                                                                                                                                                                                                            | Low                               |
| Ferruginous hawk, a federal species of concern and Washington threatened species, is a breeding resident of the study area, and has been observed during surveys. Four active nests were located within 5 miles of the project site, including one within 0.25 mile of a proposed turbine string. Project construction could affect breeding ferruginous hawks through disturbance if construction were to occur near an active nest. Nesting and foraging habitat could potentially be reduced if ferruginous hawks avoid the area during and after project construction. | Moderate                         | E. The ferruginous hawk nest near the project site would be monitored by a wildlife biologist prior to construction to determine occupancy and the need for possible construction timing restrictions. If the nest is active, a buffer of at least 0.6 miles, as recommended by the Washington State Recovery Plan for Ferruginous Hawk (Richardson, 1996), would be established around the nest where no construction activity would occur until the nest was no longer active. This area would be flagged as off-limits to disturbance by construction personnel. (*)                                             | Low                               |
| Two other raptor nests (red-tailed hawk and prairie falcon) within 0.25 mile of proposed project facilities could be subject to disturbance-related impact if they were active during the construction period.                                                                                                                                                                                                                                                                                                                                                             | Low                              | F. If other raptor nests are found to be active during the construction period, a no-disturbance buffer of 1,000 feet would be marked and maintained until the nest was no longer active. (*)                                                                                                                                                                                                                                                                                                                                                                                                                       | Low                               |
| Temporary loss of elk and mule deer habitat during project construction would be approximately 114 acres. Elk and mule deer could also be displaced from the project site due to the influx of humans and heavy construction equipment and associated disturbance.                                                                                                                                                                                                                                                                                                         | Low                              | None, but implementation of mitigation measures for general wildlife species as discussed above would ensure that potential impacts would be reduced to the extent possible.                                                                                                                                                                                                                                                                                                                                                                                                                                        | Low                               |



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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                      | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                        | Residual Impacts After Mitigation |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Construction activities could affect reptiles on the project site through loss of habitat and direct mortality of individuals located in construction zones. Excavation for turbine pads, roads, or other facilities could kill individuals in underground burrows.                                                                                                                                   | Low                              | None, but implementation of mitigation measures for general wildlife species as discussed above would ensure that potential impacts would be reduced to the extent possible.                                                                                                                                                                                                                                                                                                                                                                                      | Low                               |
| Construction activities in spring could affect birds by causing the destruction of a nest with eggs or young (for ground- and shrub-nesting species). Construction activity near an active nest or primary foraging area could cause birds to be temporarily displaced. Breeding effort could also be disturbed and foraging opportunities temporarily altered during the construction period.        | Low                              | None, but implementation of mitigation measures for general wildlife species as discussed above would ensure that potential impacts would be reduced to the extent possible.                                                                                                                                                                                                                                                                                                                                                                                      |                                   |
| <b>Operation and Maintenance</b><br>Approximately 128 acres of native habitat would be permanently removed for project facilities. This area may currently support wildlife by providing food, cover, or space for a variety of species.                                                                                                                                                              | Low to High                      | See 2.A. and 2.B., above, for specific mitigation.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Low to Moderate                   |
| Ferruginous hawk, a federal species of concern and Washington threatened species, is a breeding resident of the study area. The project could result in about one death per year.                                                                                                                                                                                                                     | High                             | G. Ferruginous hawk nesting opportunities, as identified by the Washington State Recovery Plan for Ferruginous Hawk, would be constructed or created in areas of native habitat more than 5 miles away from the proposed project and any other proposed wind plants in the area. At least three nesting opportunities would be created, monitored, and maintained for a minimum of 5 years for each nest impacted by construction of the project. The location, type of nesting opportunities, and monitoring program would be approved by the WDFW. (*)          | Moderate to High                  |
| Peregrine falcon, a federal species of concern and Washington endangered species, is a rare migrant through the study area but has a potential risk of collision with wind turbines.                                                                                                                                                                                                                  | Low                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Low                               |
| Golden eagle, a Washington candidate species, is a rare migrant and winter resident in the study area and may be at risk of collision with wind turbines. Expected mortality of golden eagle could be as high as one per year.                                                                                                                                                                        | Low                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Low                               |
| Loggerhead shrike (a federal species of concern and Washington candidate species), sage thrasher, and sage sparrow (Washington candidate species) have been observed in spring and summary surveys and are likely breeding residents in big sagebrush stands in the project area. They could be at risk of collision with wind turbines; however, use estimates for these species are relatively low. | Low                              | H. Long term impacts of wind turbines on other raptor nesting/foraging areas would be mitigated by: 1) avoiding placement of any facilities within 0.6 mi. of any nest; or 2) placing additional nesting structures (3 per existing nest within 0.6 mile of wind turbines) in suitable nesting areas at least 1 mile away from any wind turbines. (*)<br><br>I. Raptor anti-perching devices would be installed on all new overhead power line poles within 1 mile of turbine strings to limit potential raptor use near the wind turbines. All power lines would | Low                               |

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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Residual Impacts After Mitigation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| With full build-out of the proposed project, a range of 0-9 raptor fatalities per year would be expected. The range of potential bird mortality for passerines would be expected to fall between approximately 360 and 1565 birds per year. The per turbine mortality rate for all birds would be expected to be between 0.6 and 2.8 birds per turbine per year.                                                                                                                        | Low to Moderate                  | be constructed following <i>Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996</i> (APLIC, 1996); specifically, conductors would be spaced as recommended by the study to minimize the potential for bird electrocution. (✓)<br><br>J. A post-construction monitoring program would be developed in coordination with the SMPT. The program would monitor avian use of the site and avian and bat mortality using standardized carcass searches, and scavenging and searcher efficiency trials during the first year of operation of the project. (*)<br><br>Other mitigation may be implemented if identified through Section 7 consultation with the USFWS. (*) | Low to Moderate                   |
| Displacement effects may occur to the grassland- and shrub-steppe avian species occupying the study area.                                                                                                                                                                                                                                                                                                                                                                               | Low to Moderate                  | See 2.A., above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Low to Moderate                   |
| Operations would not affect raptor nests unless there were displacement effects that caused raptors to not return to the nests close to the project site.                                                                                                                                                                                                                                                                                                                               | Low                              | See 2.H-I, above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Low                               |
| Migratory bat species are at risk of collision with wind turbines, most likely during migration periods. Full build-out of the proposed project could result in approximately 400 bat fatalities per year. Both hoary bats and silver-haired bats, two common fatalities at other wind plants, have been recorded on the nearby ALE and are expected to migrate through the study area. No federal or state endangered or threatened bats would potentially be affected by the project. | Low                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Low                               |
| Vehicle traffic could periodically displace elk and mule deer. The level of use of the project site could be lower during the first few years of operation; however, it is likely that over the long-term, elk and deer would become accustomed to the project facilities and would continue to use the project site.                                                                                                                                                                   | Low                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Low                               |

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Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts           | Residual Impacts After Mitigation |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Decommissioning</b><br>Impacts would be similar to construction impacts but lower, assuming that all access roads remain in place. Vehicles would travel on established roadways, which would not impact wildlife habitat. Habitat around facilities to be removed would likely be impacted to the same extent as described for construction.                                                                                                                         | Low                              | Mitigation for impacts to wildlife would follow procedures in use at the time of decommissioning.                                                                                                                                    | Low                               |
| <b>4. Visual Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                  |                                                                                                                                                                                                                                      |                                   |
| <b>Construction</b><br>Visual impacts resulting from construction activities would be limited to the sight of vehicles and equipment used in project construction and dust from construction activities.                                                                                                                                                                                                                                                                 | Low                              | A. Keep vehicles and equipment on the site and not parked near residential or public access areas. Store equipment and supplies out of sight (if practical), and remove damaged or unusable equipment. Control dust by watering. (✓) | Low                               |
| <b>Operation and Maintenance</b><br>Substantial alteration to the existing visual character and quality of the study area would result from installation of the wind turbines along the ridgeline and down the slopes of the Rattlesnake Hills.                                                                                                                                                                                                                          | Low to High                      | None available.                                                                                                                                                                                                                      | Low to High                       |
| The Federal Aviation Administration (FAA) could require as many as 125 to 175 flashing red (nighttime) and white (daytime) lights on top of the wind turbines for aircraft safety. Although these lights are meant to be visible from aircraft and less visible from ground level, the presence of these lights could create a substantial change in daytime views and the night sky from residential areas and roadways, and would add a new source of light and glare. | Low to High                      | B. Among the FAA approved lighting devices available, use those that are designed to be least visible from the ground level of the surrounding landscape. (*)                                                                        | Low to High                       |
| In the eastern portion of the study area, residents would view the wind turbines and associated facilities frequently and for long periods of time and could perceive the visual character of the study area to be substantially altered, both during the day and at night.                                                                                                                                                                                              | High                             | None available.                                                                                                                                                                                                                      | High                              |
| <b>Decommissioning</b><br>Visual impacts would be similar to those described for construction and would consist primarily of the sight of construction vehicles and dust. The landscape would no longer be impacted by the presence of wind turbines and other facilities after the project was decommissioned.                                                                                                                                                          | Low                              | Implement mitigation in use at the time of decommissioning, likely to be similar to that recommended for construction.                                                                                                               | Low                               |

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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Residual Impacts After Mitigation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>5. Cultural Resources</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |
| <b>Construction</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |
| Many of the cultural resources in the study area could be significantly and adversely affected by project construction. However, most archaeological sites in the study area are small in size and appear to be avoidable with careful siting of project facilities. Cultural resources other than archaeological features, such as traditional cultural properties (TCPs), may also be present within or adjacent to the project site and could be adversely impacted. Information provided by the Wanapum elders is strongly suggestive that a TCP is present on the ridgetops of the Rattlesnake Hills; however, formal oral history investigations with the Yakama Nation and Wanapum Band have not yet occurred. | High                             | <p>A. Mitigation measures would follow procedures outlined in 36 <i>Code of Federal Regulations</i> (CFR) 800 and could include preconstruction data recovery collections and excavations, and monitoring of earth-disturbing construction operations by one or more qualified archaeologists and representatives of the affected tribes (for areas where buried cultural deposits could be present). BPA would adopt mitigation measures in its Record of Decision and would develop contracts as necessary to establish a binding commitment to implement the mitigation measures. (*)</p> <p>B. A cultural resources mitigation monitoring plan (CRMMP) could be prepared in consultation with the affected tribes, BPA, Benton County, and the Washington State Historic Preservation Office (SHPO). It would provide a detailed plan to guide the archaeological and tribal monitoring of earth-disturbing construction and would outline specific procedures to be followed if unanticipated discoveries were made during construction. The CRMMP would include procedures for issuing stop-work orders to construction contractors if discoveries were made and would also outline possible mitigation measures (treatment plans) to be employed in the event that significant cultural resources were discovered. The CRMMP would include procedures to deal with the unanticipated discovery of Native American skeletal remains consistent with all applicable state and federal laws and regulations. (*)</p> <p>C. If TCPs are determined to be present, mitigation measures would be developed in consultation with the Yakama Nation and Wanapum Band. (*)</p> | Low                               |
| Indirect impacts to cultural resources could occur due to vandalism.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Low                              | <p>D. The project site is located primarily on fenced private property and new access roads would have locked gates and "No Trespassing" signs. (✓)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Low                               |

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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                               | Residual Impacts After Mitigation |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| <b>Operation and Maintenance</b><br>Assuming that resources were identified but significant adverse effects were successfully avoided during construction, it is unlikely that operation and maintenance activities would result in harm to the avoided cultural resources.                                                                                                                                                                                                                                                                                                                                                                  | Low                              | None necessary because implementation of a carefully conceived CRMMP would further reduce the potential for harmful effects of project operation and maintenance.                                                                                                                                                                                                                                                                                                                                                        | Low                               |
| <b>Decommissioning</b><br>Impacts could be the same as those for construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Low                              | Implement mitigation in use at the time of decommissioning, likely to be similar to that recommended for construction.                                                                                                                                                                                                                                                                                                                                                                                                   | Low                               |
| <b>6. Noise</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   |
| <b>Construction</b><br>Pile driving and blasting, if required, would result in temporary loud noise in the study area. There also would be increased noise from rock quarry activities such as crushing; however, the nearest residence to a proposed rock quarry is over 2 miles away. Construction vehicles traveling on State Route 241 and along Lewandowski, Gap, Snipes, Crosby, Crooks, Bennett, and other nearby roads would temporarily increase noise levels. While temporary construction noise may be audible and exceed current levels, it is exempt from noise limits during daytime hours when construction would take place. | Low                              | A. Limit construction activities within 1 mile of any residence to the hours between 7:00 a.m. and 7:00 p.m. (*)<br>B. Notify nearby residents of planned unusually noisy construction activities (particularly blasting and pile driving) and provide them with a contact phone number for the project. (*)                                                                                                                                                                                                             | Low                               |
| <b>Operation and Maintenance</b><br>The predicted noise levels from the 900-kW wind turbines proposed in the eastern portion of the study area would affect five residences. Nighttime noise levels would increase over existing conditions (in a range of 21 to 31 dBA). Nighttime noise levels at one residence would also exceed the WAC standard.                                                                                                                                                                                                                                                                                        | High                             | C. Remove from the proposed project layout all wind turbines within 1,000 feet of an existing residence. (*)<br>D. Conduct an acoustical analysis of the final turbine layout for all wind turbines to be located within 1 mile of an existing residence, prior to obtaining construction permits from Benton County. The analysis would be conducted using noise level data for the final turbine type, size, and layout, and would demonstrate compliance with the 10-dBA increase criteria established by the county. | Low                               |
| Daytime noise levels generated by the wind turbines would not be expected to exceed the daytime WAC standard of 60 dBA at any of the residences. Noise levels during the daytime would increase over ambient levels from zero up to 27 dBA at residence 5.                                                                                                                                                                                                                                                                                                                                                                                   | Low to High                      | Additional noise mitigation may require additional setbacks for the wind turbines. (*)                                                                                                                                                                                                                                                                                                                                                                                                                                   | Low                               |



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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                               | Residual Impacts After Mitigation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Water Use: Water would be transported in 5,000-gallon water trucks to the project site. Sources of water for the project have not been finalized but include soliciting a holder of an irrigation water right to obtain a temporary transfer, and soliciting a well owner with an approved water right to apply for a Short-term Use of Water for a nonrecurring project. Other nearby municipal sources of water are being evaluated, and appear to be available from the City of Sunnyside. | Low                              | <ul style="list-style-type: none"> <li>Apply stabilization measures such as temporary seeding, permanent seeding, vegetative buffer strips and other appropriate practices, and structural measures such as silt fences, sediment traps, and drainage swales.</li> <li>Minimize construction and increase gravel cover on roads during wet weather to reduce potential rutting and soil loss. (✓)</li> </ul> None necessary.                                                                             | Low                               |
| Wetlands: Improvements to the western access road, including installation of a culvert or upgrade to the existing ford, would impact the fringe wetland associated with Sulphur Creek (a Category III emergent wetland). Installation of a culvert would disturb approximately 180 square feet (0.004 acre) of wetland.                                                                                                                                                                       | Moderate                         | D. A permit to fill the Sulphur Creek wetland and Waters of the U.S. would be required from ACOE, Ecology, and Yakima County, and replacement wetlands or restoration of existing wetlands would be provided as specified by these agencies. A mitigation plan describing proposed replacement/restoration would be prepared and submitted to the U.S. Army Corps of Engineers (ACOE), the state of Washington, and Yakima County for their approval, and this mitigation plan would be implemented. (*) | Moderate                          |
| <b>Operation and Maintenance</b><br><br>Surface Water Hydrology: New permanent structures such as tower foundations and operation and maintenance (O&M) buildings would slightly increase the amount of impervious surface area and alter runoff rates and patterns.                                                                                                                                                                                                                          | Low                              | E. Construct permanent drainage and erosion control facilities, as necessary, to allow permanent stormwater passage without damaging the roads or adjacent areas and without increasing sedimentation and runoff to intermittent streams that flow to the Yakima River. (✓)                                                                                                                                                                                                                              | Low                               |
| Water Quality: The O&M buildings would provide potable drinking water and restrooms. An onsite septic field would be developed for each facility and would be located according to guidelines provided by the county.                                                                                                                                                                                                                                                                         | Low                              | F. Develop an onsite septic field for each operation and maintenance facility and locate according to guidelines provided by the county. (✓)                                                                                                                                                                                                                                                                                                                                                             | Low                               |



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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Residual Impacts After Mitigation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Water Use: The only water normally required for project operation would be a maximum of 5,000 gallons per day for all three O&M facilities for lavatory and kitchen uses by maintenance employees. Occasional turbine blade washing might be conducted.                                                                                                                                                                                                                                                                                       | Low                              | None necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Low                               |
| Wetlands: Road maintenance activities, such as periodic grading, are not anticipated to have a measurable effect on Sulphur Creek.                                                                                                                                                                                                                                                                                                                                                                                                            | Low                              | See 7.C., above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Low                               |
| <b>Decommissioning</b><br>Impacts would be similar to those described for construction impacts; however, existing roads would be used for decommissioning activities, thereby reducing soil-disturbing activity. Less water would be used because concrete foundations would not be constructed and access roads would likely remain in place. Up to 5,000 gallons of water used per day at the O&M facilities would be abandoned.                                                                                                            | Low                              | See 2.H., above. Implement mitigation in use at the time of decommissioning, likely to be similar to that recommended for construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Low                               |
| <b>8. Transportation and Traffic</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   |
| <b>Construction</b><br>Some vehicles would likely have a gross vehicle weight (GVW) of more than 80,000 pounds (maximum legal load limit) when fully loaded.<br><br>Construction vehicles would use Benton County paved roads (Gap, Hinerling, Snipes, and Crosby), in addition to portions of Rothrock, Bennett, Rotha, Crooks, Jones, and Missimer Roads, which are all gravel. None of these county roads were built to withstand the proposed loads. Some or all of these roads may need to be upgraded to support construction vehicles. | Moderate to High                 | A. Prior to construction, the project developer would coordinate with Yakima and Benton Counties to determine road capacity limits, obtain any necessary overweight permits, and agree on other steps to accommodate overweight loads or avoid road damage. (✓)<br><br>B. Prior to construction, the project developer and a representative of the County Public Works Department would videotape any county roads proposed to be used. A written agreement would be established between both Benton and Yakima Counties and the project developer and construction contractor stating that all roads would be restored to the same or better condition than they were before construction. (*) | Low                               |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Impact Level Prior to Mitigation             | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Residual Impacts After Mitigation           |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|
| <p>The total number of one-way construction vehicle trips would be no more than 100 trips per day estimated to be divided between the western and eastern entrances to the project site (State Route [SR] 241 to the west and Gap Road to the east).</p> <p>Using an estimated 1.3 persons per vehicle average automobile occupancy rate, 538 daily trips and 269 p.m. peak hour trips would be generated by the construction workforce during the 4-month peak period. Level of service (LOS) C and better is the estimated level of service for a peak hour impacting the local roadways.</p> <p><b>Operation and Maintenance</b></p> <p>Assuming that each employee drove a personal vehicle to the project site every day, there would be approximately 30 daily trips, 15 of which would occur during the peak time periods.</p> <p>The new access roads on private land could provide a long-term benefit to landowners and would provide increased access for emergency vehicles.</p> <p><b>Decommissioning</b></p> <p>Impacts would be similar to those for construction; however, assuming that the roadways would remain in place, heavy vehicle trips would consist primarily of transporter trucks carrying wind turbines and transformers and the resulting workforce and vehicle trips would be considerably smaller.</p> | <p>Low</p> <p>Low</p> <p>Low</p> <p>Low</p>  | <p>C. The project developer and/or construction contractor would prepare a construction traffic control plan and construction management plan to address timing of heavy equipment and material deliveries, signage, lighting, traffic control device placement, dust and noise control, and the establishment of work hours outside of peak traffic periods. Methods for mitigating potential traffic impacts could include such activities as stationing flag persons at the access roads into the site, and placing advance warning flashes, flag persons, and signage along the roadways. (✓)</p> <p>None necessary due to minimal operation traffic.</p> <p>None necessary.</p> <p>Implement mitigation in use at the time of decommissioning, likely to be similar to that recommended for construction.</p> | <p>Low</p> <p>Low</p> <p>Low</p> <p>Low</p> |
| <b>9. Geology, Seismicity, and Near-Surface Soils</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                             |
| <p><b>Construction</b></p> <p>Geologic Formations: Construction of the project would alter the landscape with cuts-and-fills for roadways, installation of underground power lines, and leveling for turbine foundations.</p> <p>The use of an existing quarry and development of a new quarry would temporarily alter the topography at these sites.</p> <p>Slope Stability: Steep slopes and landslide-prone areas are present in the study area. Historical landslide activity has been identified in localized areas in the greater project vicinity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <p>Low</p> <p>Low to Moderate</p> <p>Low</p> | <p>A. Use of standard engineering practices in accordance with the <i>Uniform Building Code</i> (UBC) (as discussed below for impacts to near-surface soils) would reduce impacts to a low level. (✓)</p> <p>B. No additional mitigation beyond requirements of land use permit and reclamation plan.</p> <p>None necessary because project facilities would not be located in historical or potential landslide locations.</p>                                                                                                                                                                                                                                                                                                                                                                                    | <p>Low</p> <p>Low</p> <p>Low</p>            |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                       | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Residual Impacts After Mitigation |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Near-Surface Soils: Erosion potential in the study area is typically moderate to high with the presence of existing vegetation. Due to steady, high wind speed, areas of vegetation removal would expose soils to accelerated water and wind erosion until stabilized. Repeated equipment and haul truck traffic could cause soil compaction over a limited area.                                                      | Low to Moderate                  | <p>C. Roads would be designed by a licensed professional engineer and the turbine foundations would be designed and engineered according to the Uniform Building Code. Standard approved construction practices and erosion management techniques (also addressed in 7.C., above) would be employed to prevent and control erosion, including:</p> <ul style="list-style-type: none"> <li>• Minimizing vegetation removal</li> <li>• Avoiding construction on steep slopes or areas designated as having a high susceptibility of erosion</li> <li>• Properly designing cut-and-fill slopes</li> <li>• Installing roadway drainage to control and disperse runoff; ensuring that access roads contain pervious, gravel surfaces</li> <li>• Applying erosion control measures such as silt fencing, straw mulch, straw bale check dams, and soil stabilizers, as well as reseeding disturbed areas as required</li> <li>• Apply stabilization measures such as temporary seeding, permanent seeding, vegetative buffer strips and other appropriate practices, and structural measures such as silt fences, sediment traps, and drainage swales.</li> <li>• Minimizing construction and increasing gravel cover on roads during wet weather to reduce potential rutting and soil loss.</li> </ul> <p>In addition, haul truck traffic would be limited to improved road surfaces, minimizing soil compaction and disturbances. The project developer would comply with all land use permit requirements. (✓)</p> | Low                               |
| Gravel Resources: Impacts from gravel production at each quarry site would include temporary disturbance of land within the 8-acre area. Specifically, areas in the vicinity of the batch plant, crusher, stockpiles, and along access roads would be disturbed. Other impacts would include increased soil compaction potential due to haul trucks, and dust production from the crusher operation and truck traffic. | Low to Moderate                  | <p>D. Reclaim (restore) all disturbed areas at quarry sites at the completion of construction activities as outlined in a DNR/Benton County-approved reclamation plan (*)</p> <p>E. Use water trucks to control construction dust at the quarry sites. (✓)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Low to Moderate                   |
| <b>Operation and Maintenance</b><br>Slightly increased runoff water would be produced due to the addition of up to 44.5 miles of gravel access roads and new impervious area from turbine pads and operation and maintenance buildings.                                                                                                                                                                                | Low                              | Same as 7.C., above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Low                               |

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## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                                                                  | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts        | Residual Impacts After Mitigation |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| The project would operate in an area with potential for earthquake events that are considered of low risk. Landslides in steeply-sloped areas could be triggered during an earthquake due to ground shaking and could potentially impact the project facilities. However, the area is considered to have low to moderate potential for such events. No project facilities would be constructed on historical landslide locations. | Low                              | F. Design all facilities to current seismic standards for the 1997 UBC seismic zone 2B. (✓)<br>G. Identify slope stability hazards and incorporate into the facility design as necessary. (✓)                                     | Low                               |
| <b>Decommissioning</b><br>Impacts would be similar to those described for construction. Due to steady, high wind speed, areas of project facility removal would expose soils to accelerated water and wind erosion until stabilized. Repeated equipment and haul truck traffic would cause negligible soil compaction.                                                                                                            | Low                              | See 2.H., above. Base reclamation procedures on site-specific requirements and techniques commonly used at the time of decommissioning, and likely to include regrading, topsoiling, and revegetation of all disturbed areas. (✓) | Low                               |
| <b>10. Socioeconomics and Public Services</b>                                                                                                                                                                                                                                                                                                                                                                                     |                                  |                                                                                                                                                                                                                                   |                                   |
| <b>Construction</b><br>Local hiring would depend upon the availability of workers with appropriate skills, but up to half of the projected peak construction workforce of 350 workers could be local.                                                                                                                                                                                                                             | Beneficial                       | None necessary.                                                                                                                                                                                                                   | Beneficial                        |
| Increased purchase of goods and services and increased property tax revenues could result from a slight increase in local population if workers outside the area were hired.                                                                                                                                                                                                                                                      | Beneficial                       | None necessary.                                                                                                                                                                                                                   | Beneficial                        |
| There would be no human health or environmental impacts on minority and low-income populations because the project would be located on private property and not in the vicinity of any low-income or minority populations. These individuals could experience a beneficial impact from construction of the project if they became part of the workforce.                                                                          | No Impact                        | None necessary.                                                                                                                                                                                                                   | No Impact                         |
| Up to 88 temporary housing units could be required if up to 50 percent of construction workers were hired locally.                                                                                                                                                                                                                                                                                                                | No Impact                        | None. Adequate housing is available in the local communities for temporary workers.                                                                                                                                               | No Impact                         |
| The need for medical and police services at the project site could increase during construction as a result of the number of vehicles and employees on the site.                                                                                                                                                                                                                                                                  | No Impact                        | None. Adequate public services are available in the greater project vicinity.                                                                                                                                                     | No Impact                         |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                       | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                   | Residual Impacts After Mitigation |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Construction activities could increase the potential for fires due to typical construction activities such as installation of electrical equipment, increased traffic, and use of vehicles on the project site. Portions of the project site are not located in a fire protection district.                                                            | No Impact                        | A. Firefighting services would be provided primarily by the project developer so additional firefighting services would not be required. A fire emergency plan would be developed and submitted to Benton and Yakima County fire marshals for approval and shared with the Hanford Fire Department prior to project construction. See Public Health and Safety Section 12.B. below for more information. (✓) | No Impact                         |
| <b>Operation and Maintenance</b>                                                                                                                                                                                                                                                                                                                       |                                  |                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |
| Up to 15 full-time O&M staff would be permanently employed at the project site and most would be hired locally.                                                                                                                                                                                                                                        | Beneficial                       | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | Beneficial                        |
| There would not be human health or environmental impacts on minority and low-income populations because the project would be located on private property and not in the vicinity of any low-income or minority populations. These individuals could experience a beneficial impact from operation of the project if they became part of the workforce. | No Impact                        | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | No Impact                         |
| DNR would receive lease payments from the project developer for that portion of the project on DNR lands. This would result in a beneficial impact to local school districts because they would receive the income from lease payments.                                                                                                                | Beneficial                       | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | Beneficial                        |
| The assessed value of affected properties would increase when project facilities are added, leading to an increased tax base for Yakima and Benton Counties.                                                                                                                                                                                           | Beneficial                       | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | Beneficial                        |
| Full build-out of the project would add about \$44 million to the local economies of Benton and Yakima Counties in the form of goods and services purchased as part of project construction.                                                                                                                                                           | Beneficial                       | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | Beneficial                        |
| The proposed project would require electricity, water, telephone, and sewer services, none of which are currently available on the project site but are readily available in the greater project vicinity.                                                                                                                                             | No Impact                        | None Necessary.                                                                                                                                                                                                                                                                                                                                                                                              | No Impact                         |
| Impacts to fire, medical, and police services would be similar to those described for construction of the proposed project.                                                                                                                                                                                                                            | No Impact                        | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | No Impact                         |
| <b>Decommissioning</b>                                                                                                                                                                                                                                                                                                                                 |                                  |                                                                                                                                                                                                                                                                                                                                                                                                              |                                   |
| Up to 15 full-time jobs created as part of the project would be eliminated.                                                                                                                                                                                                                                                                            | Adverse                          | None necessary.                                                                                                                                                                                                                                                                                                                                                                                              | Adverse                           |

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Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                 | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Residual Impacts After Mitigation |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Property tax revenues would decrease.                                                                                                                                                                                                                                                                            | Adverse                          | None available.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Adverse                           |
| Decommissioning activities would result in temporary construction employment similar to that projected for facility construction.                                                                                                                                                                                | Beneficial                       | None necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Beneficial                        |
| <b>11. Air Quality</b>                                                                                                                                                                                                                                                                                           |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |
| <b>Construction</b><br>Vehicle emissions would occur from construction vehicles such as trucks, bulldozers, and portable cement mixers. Fugitive dust emissions would be caused by disturbing the land for construction of project facilities.                                                                   | Low                              | A. Prior to construction, submit a dust control plan for approval by the Yakima Regional Clean Air Authority (YRCAA) and the Benton Clean Air Authority, in accordance with their regulations. Implement the plan to reduce the impact of construction dust, including watering gravel roads to suppress nuisance levels of dust, as appropriate. (✓)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Low                               |
| <b>Operation and Maintenance</b><br>During operation of the project, limited amounts of fugitive dust emissions would be caused by traveling on the gravel access roads.                                                                                                                                         | Low                              | No additional mitigation necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Low                               |
| <b>Decommissioning</b><br>Impacts would be similar to those described for construction.                                                                                                                                                                                                                          | Low                              | Implement mitigation in use at the time of decommissioning, likely to be similar to that recommended for construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Low                               |
| <b>12. Public Health and Safety</b>                                                                                                                                                                                                                                                                              |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                   |
| <b>Construction</b><br>Potential health and safety risks to workers include risk of electric shock from electrical equipment and power lines; fire hazards; hazardous materials spills (for example, fuel tanks); and injury associated with the use of heavy equipment and installation of elevated structures. | Low to Moderate                  | A. Prior to construction, require all onsite construction contractors to prepare a site health and safety plan before initiating construction activities. The plan would inform employees and others on site what to do in case of emergencies, and would include the locations of fire extinguishers and nearby hospitals, important telephone numbers, and first aid techniques. The plan would be maintained during the life of the project. Accidental injury would be minimized by: <ul style="list-style-type: none"> <li>• Maintaining fencing and access gates around dangerous equipment or portions of the site as feasible</li> <li>• Posting warning signs near high-voltage equipment</li> <li>• Offering specific job-related training to employees, including cardiopulmonary resuscitation, first aid, tower climbing, rescue techniques, and safety equipment inspection</li> <li>• Requiring each worker to be familiar with site safety</li> </ul> | Low                               |

TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                           | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Residual Impacts After Mitigation |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Construction of the proposed project could increase the potential for brush fires due to typical construction activities such as installation of electrical equipment, increased traffic and use of vehicles on the project site, and the addition of up to 350 employees accessing the site during construction.                                          | Low to Moderate                  | <ul style="list-style-type: none"> <li>Assigning safety officers to monitor construction activities and methods during each work shift</li> <li>Ensuring that workers on each shift are certified in first aid</li> <li>Ensuring that a well-stocked first-aid supply kit is accessible on site at all times and that each worker knows its location</li> <li>Conducting periodic safety meetings for construction and maintenance staff.</li> </ul> <p>B. If indicated, additional prevention measures such as briefings with local hospitals and emergency service providers, identification of an emergency helicopter or aircraft landing area, and coordination with local fire officials, could be included. (✓)</p> <p>C. Because a significant portion of the proposed project site is not currently located within a county fire protection district, a fire emergency plan would be developed and submitted to Benton and Yakima County fire marshals for approval and shared with the Hanford Fire Department prior to project construction. This plan would outline onsite fire prevention and suppression methods that would be used during the construction period. The plan would require onsite water tanks containing sufficient water to fight grass fires (as determined by the fire districts). Workers would be instructed in basic fire suppression techniques. Vehicle traffic would be limited to access roads and gravel areas, and smoking would be allowed only inside vehicles. (✓)</p> | Low                               |
| Construction activities could result in potential health and safety risks to landowners and to the general public (if present) during construction.                                                                                                                                                                                                        | Low                              | D. Coordinate construction activities with landowner schedules. Unauthorized visitors would be discouraged during construction hours by the presence of construction workers, warning signs, and gates. (✓)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Low                               |
| <b>Operation and Maintenance</b><br>Potential risks during operation and maintenance include electric shock to workers in the vicinity of electrical equipment and power lines; injury related to maintenance of elevated structures such as transmission towers that are accessed with ladders or cranes; and fire resulting from maintenance activities. | Low to Moderate                  | <p>E. Maintain a detailed safety manual and frequent safety meetings for operation and maintenance workers. Avoid contact with electrical equipment through facility compliance with building codes. (✓)</p> <p>F. To prevent unauthorized access to the wind turbines, turbine tower doors would be locked and there would be no outside ladders on the towers. The substations would be fenced and locked. (✓)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Low                               |



TABLE S-1

## Potential Impacts and Mitigation of the Proposed Maiden Wind Farm

| Potential Impact                                                                                                                                                                                                                                                                                                                                                                            | Impact Level Prior to Mitigation | Proposed Mitigation Measures<br>(✓) = Standard design and/or construction measures proposed as part of the project to reduce potential impacts<br>(*) = Additional mitigation proposed to further reduce potential impacts                                                                                                                                                                                                                                                               | Residual Impacts After Mitigation |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Small amounts of fuels (diesel and/or gasoline), lubricating or other oils, and possibly small amounts of solvents would be stored onsite during operation for use in refueling and maintaining vehicles and maintaining wind turbines. In the event of an accidental hazardous materials release, possible impacts to soils, surface and groundwater resources, and wildlife could result. | Low                              | G. Accidental grass or crop fires during operation of the project would be avoided by prevention measures including avoiding idling vehicles in grassy areas, and keeping cutting torches and similar equipment away from grass. Similar to the plan prepared for construction, a fire emergency plan specifically for operation of the project would be developed and submitted to Benton and Yakima County fire marshals for approval and shared with the Hanford Fire Department. (✓) | Low                               |
| Wind turbines up to 390 feet high could potentially interfere with military training flight routes from the Yakima Training Center and the Naval Air Station at Whidbey Island.                                                                                                                                                                                                             | Low                              | H. Any spills or releases would be cleaned up, and disposed of or treated according to applicable regulations. Accidental releases of hazardous materials to the environment would be prevented or minimized through the proper containment of oil and fuel in storage areas and by locating these facilities away from drainages or sensitive resources. (✓)                                                                                                                            | Low                               |
| Power generated by the project would not raise background electric and magnetic field (EMF) to levels that would be substantially different from existing levels.                                                                                                                                                                                                                           | No Impact                        | I. The project developer would submit to the FAA a Notice of Proposed Construction or Alteration (Form 7460-1) to determine whether the wind turbines could be permitted as airspace obstructions. Lighting of the facilities likely would be required by the FAA for aircraft safety. The FAA may notify responsible military branches and request that routes be adjusted. (✓)                                                                                                         | No Impact                         |
| <b>Decommissioning</b><br>Impacts would be similar to those described for construction.                                                                                                                                                                                                                                                                                                     | Low                              | None necessary.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Low                               |

Bonneville Power Administration

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